

Viral Hepatitis an Introduction

Hepatitis, or inflammation of the liver, can be caused by several very different viruses. Symptoms of hepatitis are universal, regardless if caused by an infectious agent or chronic condition, and can include fatigue, anorexia, abdominal pain, fever, diarrhea, vomiting, jaundice, dark urine, and pale clay-colored stools. The mode of transmission, communicability, and incubation period differ greatly with the type of virus.

In the United States, hepatitis A, B, and C are the most common viruses that cause hepatitis and are of great public health significance. Hepatitis A is an acute disease with little to no sequelae but with outbreak capacity. However, hepatitis B and C disease can have a carrier state or become chronic, leading to life-threatening liver conditions.

All hepatitis viruses are reportable in Indiana according to the Communicable Disease Reporting Rule for Physicians, Hospitals, and Laboratories 410 IAC 1-2.3, October 11, 2000. Hepatitis vaccination requirements are in accordance to the 410 IAC 1-1. Vaccination recommendations are published by the Advisory Committee on Immunization Practices (ACIP).

Hepatitis A

Introduction:

Hepatitis A is an acute viral disease of the liver that is transmitted through the fecal-oral route. The virus is excreted in the stool of an infected person and can be passed person-to-person or through contaminated food and water. Hepatitis A rarely causes long-term liver damage or death.

The hepatitis A virus (HAV) is highly contagious and spreads more easily spread in situations where there are poor sanitary conditions, a lack of good personal hygiene, or contact with fecal material, such as in facilities with diapered children or adults. Outbreaks have occurred due to food contaminated by infected food handlers, contaminated water, raw or undercooked shellfish harvested from contaminated waters, contaminated produce, and infected children in day care settings. Very rarely, the hepatitis A virus can be transmitted through blood during viremia, making injection drug users at high risk. Casual contact, as in the usual workplace or school setting, does not spread the virus. However, most cases of hepatitis A have

an unknown exposure, because the time from exposure to the time symptoms begin can be long (range of 15-50 days).

Symptoms of hepatitis A occur suddenly, begin 28-30 days (range of 15-50 days) after exposure, and usually last less than 2 months. The most contagious period is from about 1 week before symptoms begin until 2 weeks after. Some people, especially children, may have no symptoms but can still spread the virus to others. There is no sequelae or long-term carrier state associated with hepatitis A, but sometimes a person can relapse for as long as 12 months.

Death from hepatitis A is rare, 0.1-0.3 %, and is more common in adults over 50. Testing for hepatitis A should not be used for screening purposes as there is no chronic disease and there is a possibility for false-positive hepatitis A IgM laboratory results.

Public Health Significance:

There is no treatment for hepatitis A other than symptom management. People who have had hepatitis A develop lifelong immunity, but effective prevention is available. The hepatitis A 2-dose vaccination series is 100% effective and will provide lifelong protection. Vaccination is recommended by the ACIP for the following high risk populations:

- Children aged 12-23 months
- Children from 24 months to 18 years where older age groups are targeted
- Injection and non-injection drug users
- Men who have Sex with Men (MSM)
- Persons traveling to or working in countries with high to moderate endemicity
- Persons with chronic liver disease
- Persons with clotting factor disorders
- Persons working with HAV infected nonhuman primates or a HAV research laboratory
- Any other person seeking protection from HAV infection

Within 2 weeks of exposure to the HAV, persons can receive post-exposure prophylaxis (PEP) in the form of immune globulin (IG) or the hepatitis A vaccine. IG is 80-90% effective during the 2-week time frame from exposure and provides protection for about 3 months. PPE has not been determined to be effective if given more than 2 weeks following exposure. Persons

recommended for PEP include household members, sexual partners, or day care attendees of infected cases.

The Indiana State Department of Health (ISDH) provides PEP for those recommended contacts of infected cases. The ISDH stockpiles thousands of doses of IG for a mass prophylaxis event, but does not yet carry hepatitis A vaccine. IG costs roughly \$22 per dose and can be difficult to obtain in large quantities due to low production levels. In 2006, an unvaccinated Allen County food handler developed hepatitis A after recent international travel. The mass PEP event in Allen County is one example of the costs associated with a hepatitis A infected food handler. The Allen County Health Department (ACHD) and the ISDH put a mass prophylaxis plan into action within 24 hours of notification. The ACHD provided 4,077 doses of IG to patrons of the restaurant over a 1 week period. The approximate costs of the PEP event totaled \$22,335 for Allen County and \$89,694 for the ISDH (IG only).

Hepatitis A can be prevented by learning more about traveling to endemic areas, practicing good hand hygiene, washing all raw produce prior to consumption, not consuming raw shellfish, and drinking only treated water. If a person has symptoms of diarrhea, vomiting, and/or jaundice, they should not prepare food and should avoid contact with others (particularly in day care, health care, food handling, and untreated water settings).

Surveillance:

Hepatitis A cases have declined since the simultaneous peak use and licensure of the hepatitis A vaccine in 1995. According to the MMWR on Surveillance for Acute Viral Hepatitis - 2006, a total of 3,579 acute symptomatic cases were reported, with a national incidence of 1.2 per 100,000 populations. Once asymptomatic cases and the effect of underreporting are factored in, it is estimated there were 32,000 acute infections in 2006. Due to childhood vaccination, the rates of hepatitis A have dropped to the lowest rates on record for children aged <5 years. Hepatitis A continues to be a public health concern among MSM, with a male to female ratio of 1.18:1.

The current legislation restricts individuals from participation in high risk settings during the infectious period of hepatitis A. Currently the ISDH does not require hepatitis A vaccination for day care facilities, schools, or other high risk groups.

In Indiana, the 10-year trend of hepatitis A decreased from 329 cases in 1997 to 33 cases in 2006. Many cases have unknown exposures, while some reported traveling internationally. In 2007, Indiana suffered its first outbreak of hepatitis A in an elementary school, with 5 children becoming ill nearly one month after the index case. Children of this age were not recommended for PEP according to the CDC.

Hepatitis B

Introduction:

Hepatitis B is a serious viral disease of the liver transmitted through parenteral or mucosal exposure to the blood or body fluids (semen, vaginal secretions, and saliva) of an infected person. The incubation period of hepatitis B virus ranges from 6 weeks to 6 months, with average of 120 days. The variation is related to the amount of virus, the mode of transmission and host factors. The hepatitis B virus is 100 times more infectious than HIV. All persons who are HBsAg positive are potentially infectious. Transmission of hepatitis B virus occurs through sexual or household contact with an infected person, injection drug use, perinatal transmission from mother to infant, and nosocomial exposure.

Acute hepatitis B illness is characterized by nausea, anorexia, fever, malaise, headache, myalgia, right upper quadrant abdominal pain, dark urine, skin rash and jaundice. Approximately 50% of adults with acute infection are asymptomatic. Persons with chronic infection are often asymptomatic as well, and because they were not aware they are infected, they are thus capable of infecting others.

Most adult acute hepatitis B infection results in complete recovery, eliminating the HBsAg from the blood and immunity from future infection by producing anti-HBs. Chronic infection is associated with an increased risk for chronic liver disease, cirrhosis, liver failure, hepatocellular carcinoma, and death.

There is no specific treatment of acute hepatitis B infection other than supportive. Chronic hepatitis B is treatable with medication. While these treatments do not provide a complete cure, they do reduce hepatitis B viral replication and the risk of progression to serious liver damage.

Immunization with hepatitis B vaccine is the most effective means of preventing hepatitis B infection and its consequences.

Public Health Significance:

In 1991, the CDC published Hepatitis B Virus a Comprehensive Strategy for eliminating transmission in the United States through universal childhood vaccination. These were recommendations of the Advisory Committee on Immunization Practices (ACIP). The strategy includes: universal vaccination of infants beginning at birth, routine screening of all pregnant women for hepatitis B infection and immunoprophylaxis to infants born to infected women or women of unknown status, routine vaccination of previously unvaccinated children and adolescents, and the vaccination of high-risk adults. ACIP updated strategies on December 23, 2005 and December 8, 2006.

After three intramuscular doses of hepatitis B vaccine, more than 90% of healthy adults and more than 95% of infants, children, and adolescents will develop adequate antibody responses. The dosage of vaccine varies dependent on the age of the recipient and type of vaccine.

Post-exposure prophylaxis with hepatitis B vaccine may be started at the same time as treatment with hepatitis B immune globulin (HBIG). Indications for prophylaxis may include: infants born to HBsAg positive mothers, women whose HBsAg status is unknown at delivery, sexual contacts of persons with acute infection, household contacts of persons with acute infection, and after percutaneous or mucous membrane exposure. Management of the exposed person depends on the HBsAg status of the source, the vaccination and anti-HBs response status of the exposed person.

Risk for hepatitis B infection varies with occupation, lifestyle, or environment where there is contact with blood from infected persons. Populations at high risk for hepatitis B infection include: immigrants from areas with endemic rates, institutionalized developmentally disabled, illicit parenteral drug users, homosexually active men, hemodialysis patients, and household contacts. Intermediate risk includes: incarcerated individuals, health care workers, staff for the developmentally disabled, and heterosexuals with multiple partners.

On September 19, 2008, the CDC published “Recommendations for Identification and Public Health Management of Persons with Chronic Hepatitis B Virus Infection”. This document updates and expands previous CDC guidelines for HBsAg testing and includes new recommendations for public health evaluation and management of those chronically infected and their contacts.

Surveillance:

The following is the CDC surveillance for acute hepatitis B in the United States for 2006: a total of 4,713 acute cases were reported, 77% exhibited jaundice, 40% were hospitalized, and 0.8% resulted in death. The overall incidence (1.6 cases per 100,000 populations) was the lowest ever reported, representing a decline of 81% since 1990. Rates declined in all age groups, with the highest rate reported in persons aged 25-44 years and the lowest among persons aged <15 years. The rate for males (2.0 cases per 100,000 populations) continued higher than for females (1.1 cases per 100,000 populations). All racial/ethnic population rates continue to decline with the highest rate reported for non-Hispanic blacks (2.3 cases per 100,000 populations). One third acute hepatitis B cases reported at least one sexual risk factor (8% sexual contact with person known to have hepatitis B, 34% multiple sex partners, and 15% MSM). Since 2001, the number of cases reporting sexual risk or intravenous drug users (IDU) has increased and transmission attributed to blood transfusions or dialysis has declined. In 2006, there were 80 confirmed cases of acute hepatitis B in Indiana and no cases resulted in death.

Hepatitis C

Introduction:

Hepatitis C is the leading chronic bloodborne infection in the United States. The incubation period for hepatitis C ranges from 2 weeks to 6 months with an average of 6-9 weeks. The hepatitis C virus (HCV) is transmitted by exposure to blood or body fluids. Transmission is highest among IV drug users, combat veterans and health care workers. Chronic carriers are normally asymptomatic.

Clinically defined cases of acute hepatitis C do not often occur. Eighty-five percent of infected individuals will be asymptomatic for decades. Twenty percent of cases will develop serious liver damage such as cirrhosis from hepatitis C, and 5% of those will develop liver

cancer. HCV infection is the number one cause of all liver transplants. Approximately, 8,000-10,000 people die each year as a result of complications from hepatitis C.

Public Health Significance:

Reducing the burden of HCV infection and HCV-related disease in the United States requires implementation of primary prevention activities that reduce risks for contracting HCV infection and secondary prevention activities that reduce risks for liver and other chronic diseases in HCV-infected persons. In addition, surveillance and evaluation activities are required to determine the effectiveness of prevention programs in reducing incidence of disease, identifying persons infected with HCV, providing appropriate medical follow-up, and promoting healthy lifestyles and behaviors.

Primary prevention activities can reduce or eliminate potential risk for HCV transmission from a) blood, blood components, and plasma derivatives; b) such high-risk activities as injecting-drug use and sex with multiple partners; and c) percutaneous exposures to blood in health care and other settings (i.e., tattooing and body piercing). Immunization against HCV is not available; therefore, identifying persons at risk but not infected with HCV provides opportunity for counseling on how to reduce their risk for becoming infected. People who test positive for hepatitis C are recommended to get the hepatitis A and B vaccines. Recommended standard treatment for hepatitis C is ribavarin combined with interferon treatment.

Surveillance:

Nationally, surveillance for HCV-related chronic liver disease can provide information to measure the burden of disease, determine natural history and risk factors, and evaluate the effect of therapeutic and prevention measures on incidence and severity of disease. Until recently, no such surveillance existed, but a newly established sentinel surveillance pilot program for physician-diagnosed chronic liver disease will provide baseline data and a template for a comprehensive sentinel surveillance system for chronic liver disease. As the primary source of data regarding the incidence and natural history of chronic liver disease, this network will be pivotal for monitoring the effects of education, counseling, other prevention programs, and newly developed therapies on the burden of the disease.

Indiana has been conducting surveillance on acute and chronic cases of hepatitis C that were lab reported since the latter part of 1997. On October 11, 2000, mandatory reporting of HCV results by laboratories took effect. In 2006, risk factor data collection began through voluntary investigations. This has given Indiana an idea of the burden of what population groups are at risk and risk factors that are most responsible for the disease in Indiana. The investigation of chronic cases is voluntary in Indiana due to lack of funding. Hepatitis C epidemiology would benefit from funding for staffing resources of state and local jurisdictions.

The total acute and chronic reports of HCV for the 5 year period, 2002-2006, were 27,578. Efforts were made in 2005 and 2006 to reduce the number of duplicated reports counted as cases. In 2005, there were 5,370 reported cases of hepatitis C in Indiana with 75 Indiana counties reporting at least one case of hepatitis C. This was a rate of 85.62 cases per 100,000 populations. There was a decrease in hepatitis C reported cases in 2006 with a total of 4,723, with 3 acute cases.